

1/PRIS

09/445945

430 Rec'd PCT/PTO 20 DEC 1999

-1-

**Description:**

**Filling connection for a gas cylinder valve**

This invention relates to a filling connection for gas cylinder valves according to the pre-characterizing features of claim 1.

Such a filling connection for gas cylinder valves is known from DE-GM 91 15 142. A filling connection is to be made for gas cylinder valves, especially of acetylene cylinders, with which a safe connection can be produced and undone again rapidly and reliably even by non-technical people, since the fitting position of the filling connection has to be carefully controlled with usual filling connections, which can be really complicated and troublesome for lay persons. Accordingly, in this state of the art a clamp-like connector coupling is provided, in which is mounted a cylinder valve connection piston sleeve, biased in the direction of a fitting ring.

After connection to the cylinder valve, the filling passage through the housing or valve body is opened up. However, after connecting the filling coupling on to the connection union, which later serves also as the discharge connection, the gas cylinder valve must additionally be opened by the handwheel normally provided as the actuating element, and must be closed again after the filling. As well as actuating the filling coupling, at least two further manual operations are necessary, which is very time-consuming in series filling.

Accordingly the invention is based on the object of providing a filling connection for gas cylinder valves with which the filling can be speeded up.

*This A1* This object is met by a filling connection according to the features of claim 1. Preferred embodiments are the subject matter of the dependent claims.

DRAFTING DRAWING

Through the arrangement of a separate, upwardly pointing filling union on the gas cylinder valve, in addition to the discharge connection on the side, a quick connection coupling can be fitted as the filling coupling, while the handwheel of the gas cylinder valve does not have to be opened separately for the filling. A separate gas filling passage is thus created, which is essentially independent of the discharge passage, while both passages can also open into a common through bore, being separated however in terms of flow technology both during the filling operation and also during discharge operation, in particular by check valves connected in opposition to one another.

A substantial advantage here is that the handwheel arranged on the side of the gas cylinder valve does not have to be opened for the filling, nor does it have to be closed again at the end of the filling operation. Two working steps are thus saved, so that the filling of gas cylinders is substantially speeded up. This applies in particular to automated filling by robots, since the upwardly pointing filling union is also optimally accessible in a tightly packed gas cylinder pallet.

Simultaneous filling of a plurality of gas cylinders by means of a multiple filling coupling is also possible through this, e.g. twelve gas cylinders on a pallet at a time, on to which the multiple filling coupling with twelve filling couplings can be fitted from above. The filling operation can be substantially speeded up by this.

a) Brief Description of the Drawings

An embodiment will be described and explained in more detail

✓ below with reference to the single drawing (Fig. 1).

Jns. 02

A gas cylinder valve 1 is shown schematically in Fig. 1, with a handwheel as actuating element 2 and a valve body 3. The valve body 3 of the gas cylinder valve 1 is attached to a gas cylinder 10 (e.g. for acetylene, oxygen, carbon dioxide, hydrogen or the like) in the usual way, by a screw connection.

A side discharge connection 4 is formed on the valve body 3, preferably in one piece therewith, with a suitable threaded connection corresponding to the standard for the gas in question. A spring-biased check valve 5 is arranged within the discharge connection 4 and only allows gas discharge in the accordance with the arrow shown, being blocked however in the opposite (filling) direction.

In accordance with the invention, a separate filling union 6 is arranged on the valve body 3, preferably at right angles to the discharge connection 4. The filling union 6 can be screwed into the valve body 3 as a separate component or equally, as shown, be formed in one piece with the valve body 3, like the discharge connection 4. An annular groove 6a is formed in the outer wall of the upwardly pointing filling union 6, in which the detent elements 8a of a filling coupling 8 which can be fitted from above can be connected.

The filling coupling 8 is preferably formed as a plug-in coupling with collet jaws according to EP-A 0 340 879 or DE-A 3 518 019, since appropriate safety provisions for filling gas cylinders are provided with these quick connection couplings of the applicant. However a detent ball coupling for an external profile or even if desired an inner engagement profile can optionally be used as the filling coupling 8, as is basically known from hydraulic connectors.

A spring-biased check valve 7 is also arranged in the filling union 6, namely in the bore shown in broken lines within the filling union 6. The filling union 6 also opens into a through bore 9 like the discharge connection 4, which bore communicates with the gas cylinder 10. A valve spool, not shown here, is arranged in the region of the through bore 9 and can be brought into the closed or open position by means of the handwheel 2.

In the open position of the valve spool, the through bore 9 communicates with the discharge connection 4, so that gas can be discharged, while the filling union 6 is de-coupled by the check

valve 7. After the gas cylinder 10 has largely been emptied, the gas cylinder valve 1 is closed by means of the handwheel 2 and then taken to the filling operation. However filling can also take place on site, e.g. from a tanker vehicle, where the filling coupling 8 is likewise fitted on to the filling union 6 from above and the gas cylinder 10 in question is filled.

The valve spool 2a stays closed in this filling operation, so that the handwheel 2 no longer has to be operated, in contrast to the known devices; in particular the handwheel 2 does not have to be operated in the opposite direction after completion of the filling operation. Rather it is only necessary for the filling coupling 8 to be taken off. The gas lines attached to the discharge connection 4 can even remain attached when filling on site.

The filling union 6 preferably also has a company and/or user specific form, so that only correspondingly matching filling couplings 8 can be attached. This ensures that only authorised persons can undertake the filling of the gas cylinder 10. Filling through the discharge connection 4 is also securely avoided through the spring-biased check valve 5 provided in the side discharge connection 4.

In addition it is made possible through this check valve 5 for the gas cylinder to maintain a certain residual pressure, as is required for operation of various installations or is desirable to avoid entry of air into the gas cylinder 10. Time-consuming evacuation of the gas cylinder 10 when refilling is thereby avoided.

a) *Detailed Description of the Invention*

The filling operation can moreover be largely automated, since the upwardly pointing filling union 6 is readily accessible, in particular both for manual handling devices and robots, with which the filling coupling 8 can be fitted on from above. A multiple filling station can also be used, in which the individual filling couplings 8 are suspended in that raster in which the gas cylinders 10 are fixed on a pallet.